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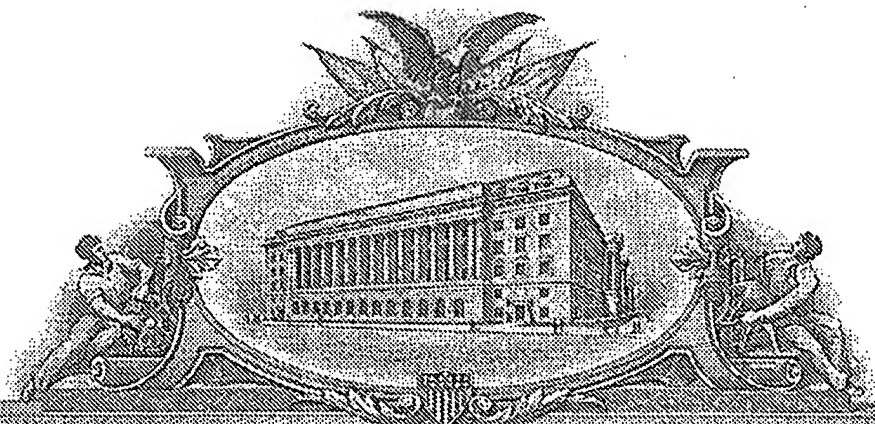
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**PROVISIONAL  
PATENT APPLICATION  
UNDER §111(b)**

*Attorney Docket No.*

026197-9062

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021304

Mail Stop PROVISIONAL PATENT APPLICATION

Commissioner for Patents

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Sir:

Enclosed for filing is a complete provisional patent application entitled "VERTICAL DISC CLEANER" invented by:

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and including the following documents:

Specification including Claims - 8 pages

Abstract of the Disclosure

Drawings - 3 sheets

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## PROVISIONAL PATENT APPLICATION FOR VERTICAL DISC CLEANER

### BACKGROUND

[0001] Optical discs such as compact discs (CD), digital video discs (DVD) and other discs for computers (e.g., CD-ROM, CD-R, CD-RW, DVD-RW, etc.) and video game systems (e.g., Xbox, Playstation, GameCube, etc.) are direct access storage devices that are written and read by laser light. Optical disc storage capacity is far greater than that for magnetic media, however, optical disc readers are more sensitive to media imperfections such as scratches, surface dust, dirt, fingerprints, smudges, and the like. Such permanent and removable media imperfections may cause the laser light to reflect and/or refract, thereby corrupting the read data. Therefore, regular maintenance of optical discs is needed to ensure data readability.

[0002] Optical disc cleaning, in its simplest form is performed by wiping the disc with a clean, soft fabric to remove surface dirt. In certain instances, prior to manually wiping the disc, a cleaning agent (e.g., alcohol, surfactant, etc.) may be sprayed or otherwise applied to the disc surface to facilitate removal of removable imperfections. Alternatively a number of mechanical disc cleaners are available. These mechanical disc cleaners typically include a clamshell shaped housing with a turntable disposed therein. The disc is placed horizontally on the turntable and is rotated for cleaning. The turntable may be hand operated by a crank and gear mechanism, or may be motorized. Use of such mechanical disc cleaners is somewhat disadvantageous for a number of reasons.

[0003] One disadvantage is that the top of the clamshell housing typically includes at least a portion of the crank and gear mechanism for rotating the disc. Therefore, the user must open the clamshell housing to determine if the disc is substantially clean. The user may not monitor the cleaning process. Additionally, the user may not apply a cleaning agent to the disc surface as it is being rotated. Another significant disadvantage to such mechanical turntable-style disc cleaners is that it can be difficult to insert and remove a disc from the cleaner. Often, such cleaners require that the user handle the disc about its perimeter after cleaning is completed. Handling the disc in this manner may be difficult if the user has small hands or lacks hand strength and/or flexibility. Certainly, it is easier to handle a disc about its center hole by

inserting a finger therethrough, however, if the disc is installed on a turntable with a spindle, this is not possible.

[0004] In view of the foregoing, there is a need for an optical disc cleaner that accepts a vertically oriented disc. Moreover, the disc cleaner should be compact, portable, easy and fun to use.

#### BRIEF SUMMARY

[0005] An embodiment of the invention provides a vertical disc cleaner. The cleaner includes a shaped housing with an elongated slot for accepting at least a portion of an optical disc. Within the housing is a power source, a motor coupled to a gear arrangement, and rollers for rotating an inserted disc by its perimeter. One roller is coupled to the gear arrangement and motor for driving the disc, and another roller is coupled to a switch for actuating the motor. A wiper pad is disposed within the housing and is urged against the disc to remove dust, dirt, fingerprints, smudges and the like.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The present invention is described with reference to the accompanying figures, which illustrate embodiments of the present invention. However, it should be noted that the invention as disclosed in the accompanying figures is illustrated by way of example only.

[0007] FIG. 1 is a perspective view of one embodiment of the vertical disc cleaner.

[0008] FIG. 2 is a front elevation view of the embodiment of FIG. 1.

[0009] FIG. 3 is a side elevation view of the embodiment of FIG. 1.

[0010] FIG. 4 is a top view of the embodiment of FIG. 1.

[0011] FIG. 5A is a front exploded view of the embodiment of FIG. 1.

[0012] FIG. 5B is a rear exploded view of the embodiment of FIG. 1.

### DETAILED DESCRIPTION

[0013] Referring now to the Figures and particularly FIG. 1, a vertical disc cleaner is shown. The cleaner 10 includes a shaped housing 20. The housing 20 may be constructed of any suitable material known in the art, but preferably the housing is constructed of a molded or formed plastic material. The housing 20 may be constructed of one or more pieces to facilitate manufacturing and/or assembly. As illustrated, the housing 20 includes an upper portion 20A and a base portion 20B. The housing 20 may include an external matte finish that provides a non-slip surface for improved gripping of the cleaner 10 during transportation.

[0014] The housing 20 is substantially hollow (FIG. 5A, 5B), and the interior houses a number of components hereafter discussed in further detail. The upper portion 20A includes an elongated slot 22 for accepting a portion of an optical disc D. The disc D, which is planar and toroidal in shape, has a circular perimeter, a reading surface R and a central hole. As known in the art, the housing 20 may include one or more of "lead-ins" (not shown) proximate the slot 22 so that the disc D may be properly guided and aligned with the cleaner's internal components such as the rollers and wiper pad (discussed in further detail hereafter) during insertion, thereby obviating damage to the disc D and the device 10. In addition, the edges of the slot 22 may be chamfered, curved, or otherwise shaped to make a smooth transition into the cleaner's interior so that the disc D does not become scratched, scuffed, or otherwise damaged during insertion and removal. The upper surface of the upper portion 20A of the housing 20 includes a depressed portion 24, which is somewhat u-shaped. As shown in FIG. 2, the lowest point of the depressed portion 24 is proximate the midpoint of the slot 22, and the depressed portion 24 substantially coincides with the central hole of the disc D.

[0015] As illustrated in FIGs. 1-4, the upper portion 20A includes a well 26. The well 26 is sized and shaped to accept a bottle B. The bottle B may be either integral with the well 26 and refillable or removable. Additionally, a removable bottle B may be disposable or refillable. The bottle B may be an atomizer or spray bottle for applying a cleaning agent onto the reading surface R of the disc D. The cleaning agent may be an alcohol such as isopropyl alcohol, a surfactant, or other liquid for facilitating cleaning of the disc D. The well 26 may be sized and shaped to accept a particular bottle B. Moreover, the well 26

and/or bottle B may include an anti-piracy element such that the well 26 only accepts bottles of the same size and shape as bottle B. Furthermore, the well 26 and bottle B may cooperate with each other such that the bottle B is properly oriented (i.e., to apply the cleaning agent on the reading surface R of the disc D). As shown in FIGs. 1, 2, 4 and 5A, the bottle B is properly oriented when the illustrated arrow on the bottle's pump head points toward the disc D.

[0016] Referring now to FIGs. 5A and 5B, the internal components of the vertical disc cleaner 10 are described in detail. As shown, a cleaning chamber accepts a portion of disc D and includes a first portion 30A and a second portion 30B. The first and second portions 30A, 30B of the cleaning chamber extend downward from the slot 22 and are spaced apart by a width corresponding to the width of the slot 22. When the portions 30A, 30B are affixed to each other, the bottom of the chamber is sealed, thereby inhibiting cleaning agent from entering the housing interior. As shown in FIG. 5A, the first portion 30A includes a number of posts or bosses that rotatably retain rollers 40 and a gear arrangement 60. The rollers 40 and gear arrangement 60 are fixed on their respective posts or bosses when the portions 30A, 30B are affixed to each other.

[0017] The rollers 40 are channeled having u-shaped or v-shaped channels along their perimeters. The channels of the rollers 40 define a plane for retaining a disc D. The rollers 40 are preferably made of a rubber or other elastomeric material such as silicone or neoprene for frictionally engaging the perimeter of a disc. Preferably, the rollers 40 do not slip against the disc perimeter, do not leave a residue on the disc, and do not scratch, mar, or wear on the disc. As illustrated, the cleaner 10 includes three rollers 40, however, fewer or additional rollers 40 may be employed. The roller 40 proximate the gear arrangement 60 is hereafter referred to as the driving roller. The driving roller is coupled to the gear arrangement 60 and rotates to frictionally drive the disc D. The illustrated gear arrangement 60 includes three spur gears that couple the driving roller to a motor 50. Other gear arrangements having more or fewer gears may be used provided that the disc D is turned at a rate of approximately 10 RPM. The motor 50 may be a toy-grade or other suitable motor as known in the art. One exemplary motor is a 3V motor powered by two (2) AA batteries, the motor shaft turning at approximately 3000 RPM when loaded.



[0018] Opposite the driving roller is a roller 40 hereafter referred to as the switch roller. As shown in FIG. 5B, the switch roller is affixed to the upper end of a lever arm 32. The lever arm 32 is pivoted at a pivot point intermediate its upper and lower ends. The lower end of the lever arm 32 is normally biased outward by spring 34. Consequently, the switch roller is biased slightly toward the driving roller. Electrical switch contacts 75 are disposed proximate the lever arm 32 and spring 34. The switch contacts 75 may be part of a microswitch or other switch means (not shown) and are in a normally open state. When the switch contacts 75 are closed, a series circuit is completed, thereby connecting a power source to the motor 50. As illustrated in FIGs. 5A and 5B, the exemplary power source is a pair of AA batteries within battery chamber 70. The batteries are accessible and replaceable via battery door 72 (FIG. 5B). Preferably, the motor 50 is powered by a direct current source, such as disposable or rechargeable batteries, however, the cleaner 10 may alternatively be powered directly by an alternating current source, or by an AC to DC adapter which is plugged into the cleaner 10 and a power outlet.

[0019] With the switch roller in its normally biased position, the distance between the switch roller and the driving roller channels is somewhat less than the diameter of disc D. As disc D is initially inserted into slot 22, the perimeter of the disc makes contact with the switch roller and driving roller. As the disc D is inserted further (downward into the cleaning chamber), the disc forces the switch roller outward (i.e., away from the driving roller). When the disc D is fully inserted into the cleaning chamber, the lowest portion of disc D contacts the roller 40 intermediate the switch roller and the driving roller, hereafter referred to as the stop roller. The stop roller is positioned to prevent the disc D from contacting the bottom of the cleaning chamber. As the disc D contacts the stop roller, the diameter of the disc forces the switch roller maximally outward such that the switch contacts 75 are closed and the motor 50 is actuated. The motor 50 may run continuously until the disc D is removed, or alternatively, the cleaner 10 may include a timing circuit, whereby after the cleaner 10 will run for a predetermined period of time (e.g., forty five seconds) and then turn off automatically. The exemplary cleaner 10 will operate many times before having to replace the batteries. Additionally, the exemplary cleaner 10 will preferably operate continuously for at least 30 minutes before substantially draining the batteries (e.g., "drained" may be defined as when the disc rotates slower than 8 RPM). In other alternative embodiments, the cleaner 10 may include an integrated circuit (IC) for

controlling the motor 50. Furthermore, the cleaner 10 may include one or more sensors in communication with the IC for detecting the condition of the inserted disc D. The one or more sensors may include a moisture sensor for detecting the level of moisture (i.e., cleaning agent) on the disc, an optical sensor for detecting particulate matter on the disc D, or other sensors or combination of sensors known in the art. Additionally, the cleaner 10 may include an ejection means (like the spring ejection means of a toaster) for facilitating removal of an inserted disc D.

[0020] As the disc D is rotated within the cleaning chamber, a wiper arm 90 is urged against the disc read surface R. The wiper arm 90 includes a soft, absorbent wiper pad 92 made of fabric, foam, or other suitable material that will not scratch, scuff, mar, or otherwise damage the disc D read surface R, and is capable of absorbing liquid such as the cleaning agent. The wiper pad 92 is preferably as long as the distance from the perimeter of the disc D to its central hole such that the disc D does not catch or snag the edges of the pad 92. One exemplary wiper pad is approximately 0.35 inches wide by 2.0 inches long. The wiper pad 92 may be permanently or removably affixed to the wiper arm 90. Moreover, the wiper arm 90 may include a "lead in" to prevent an inserted disc D from improperly contacting the wiper pad 92 and accidentally detaching the pad 92 from the arm 90. As shown in FIG. 5A, the arm 90 is oriented such that the wiper pad 92 contacts the bottom portion of disc D intermediate the switch roller and stop roller.

[0021] As shown in FIGs. 1, 4, a cover 80 mates with the upper portion 20A of the housing 20. The cover 80 may be snap-fit or otherwise releasably attached to the upper portion 20A to provide access to the wiper arm 90. The top surface of the cover 80 may include a textured or gripping portion that facilitates removal of the cover 80 from the housing 20. As illustrated, the top surface of the exemplary cover 80 includes a number of elongated ridges. As best seen in FIG. 5A, the cover portion 80 engages the linear portion of the cleaning chamber's second portion 30B. The cover 80 includes a rod with a spring mounted thereon. The wiper arm 90 is attached to the cover 80 by way of the rod and spring. The spring may be a torsion spring or the like for biasing the wiper pad 92 inward (i.e., toward the read surface R of an inserted disc D). If the wiper pad 92 is removably affixed to the arm 90, the wiper arm 90 may be fixedly attached to the cover 80. Alternatively, if the wiper pad 92 is permanently affixed to the arm 90, the wiper arm 90

may be removably attached to the cover 80 and disposable when the pad 92 becomes worn or otherwise ineffective. In yet another alternative, the cover 80, arm 90, and pad 92 combination may be an integral and replaceable assembly.

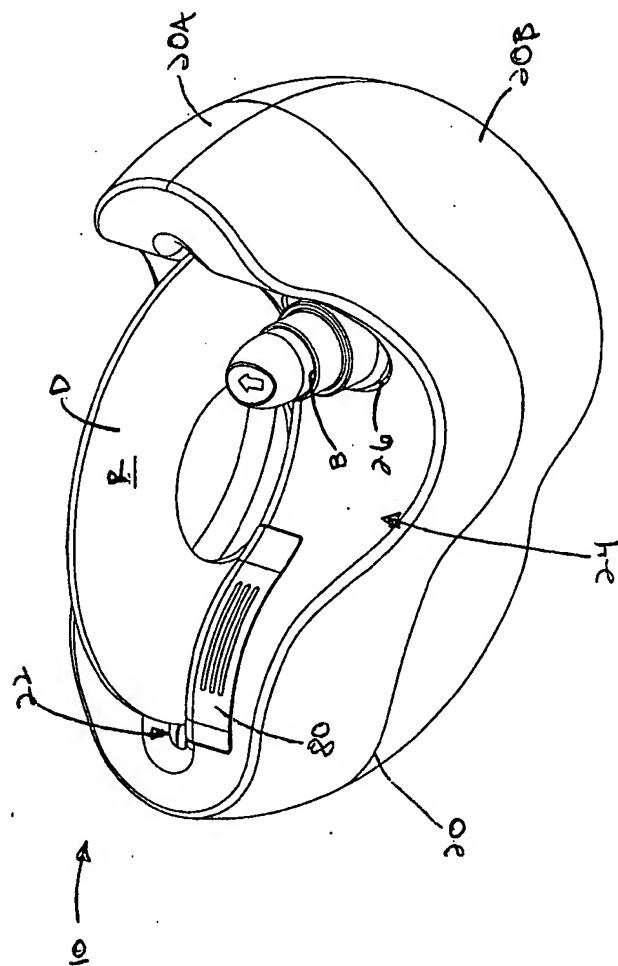
**[0022]** The use of any and all examples, or exemplary language (e.g., "such as") provided herein, is intended merely to better illuminate the invention and does not pose a limitation on the scope of the invention unless otherwise claimed. Preferred embodiments of this invention are described herein. Variations of those preferred embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors intend for the invention to be practiced otherwise than as specifically described herein. Accordingly, this invention includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the invention unless otherwise indicated herein or otherwise clearly contradicted by context.

**WHAT IS CLAIMED IS:**

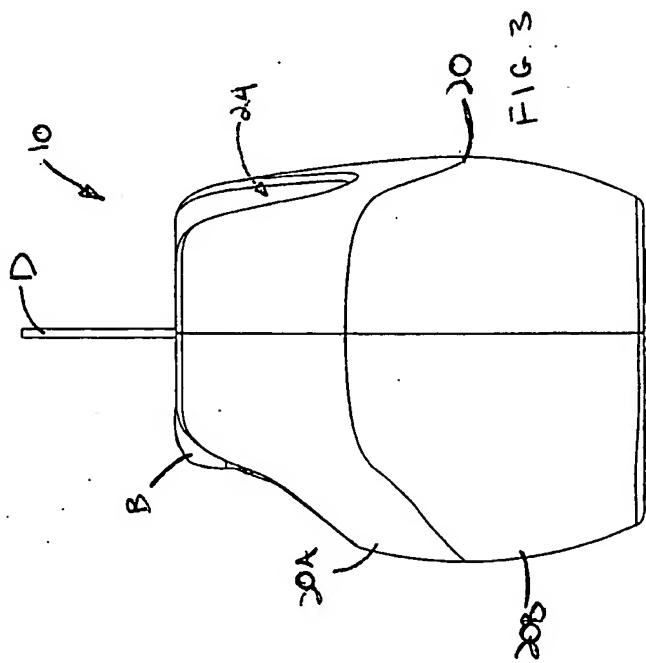
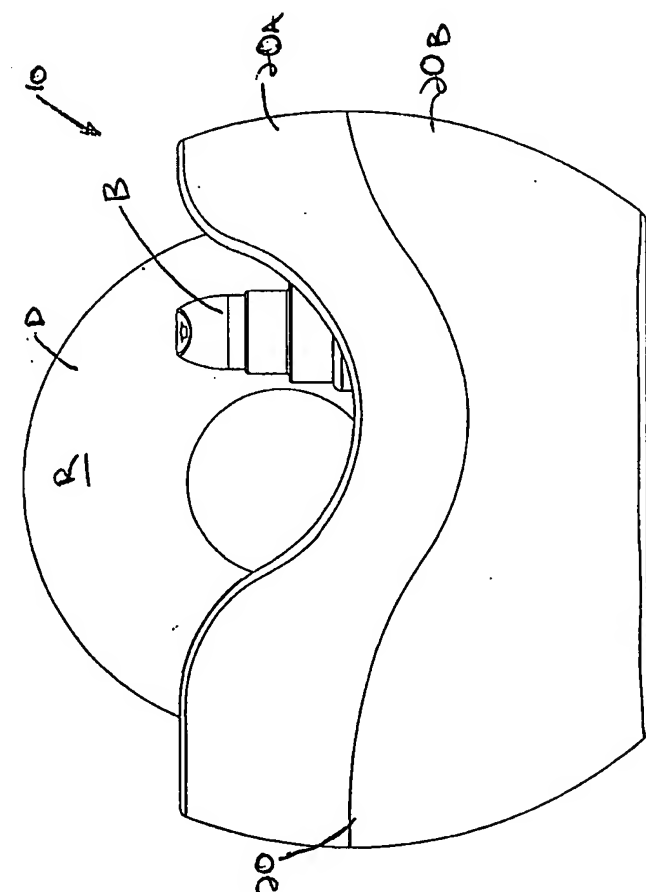
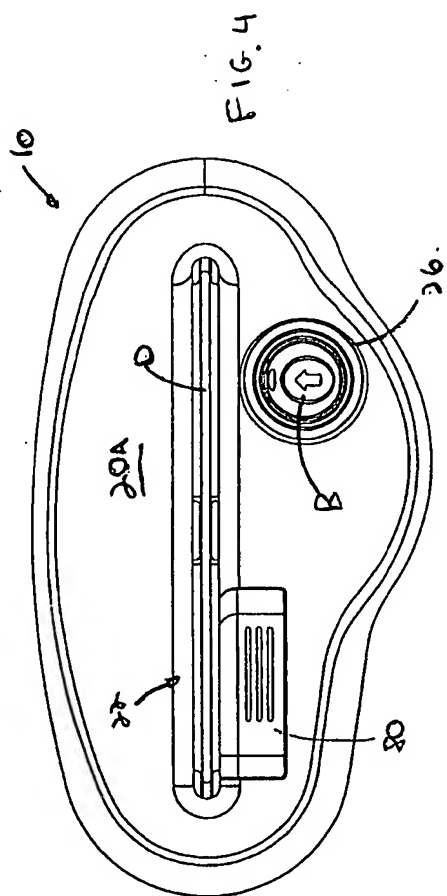
1.     **An optical disc cleaner for cleaning a vertically oriented disc comprising:  
a shaped housing that facilitates handling of the disc by its central hole;  
a drive means disposed within the housing, the drive means frictionally  
rotating the disc by its perimeter; and  
a switch means for actuating the drive means when the disc is at least  
partially inserted in the housing.**

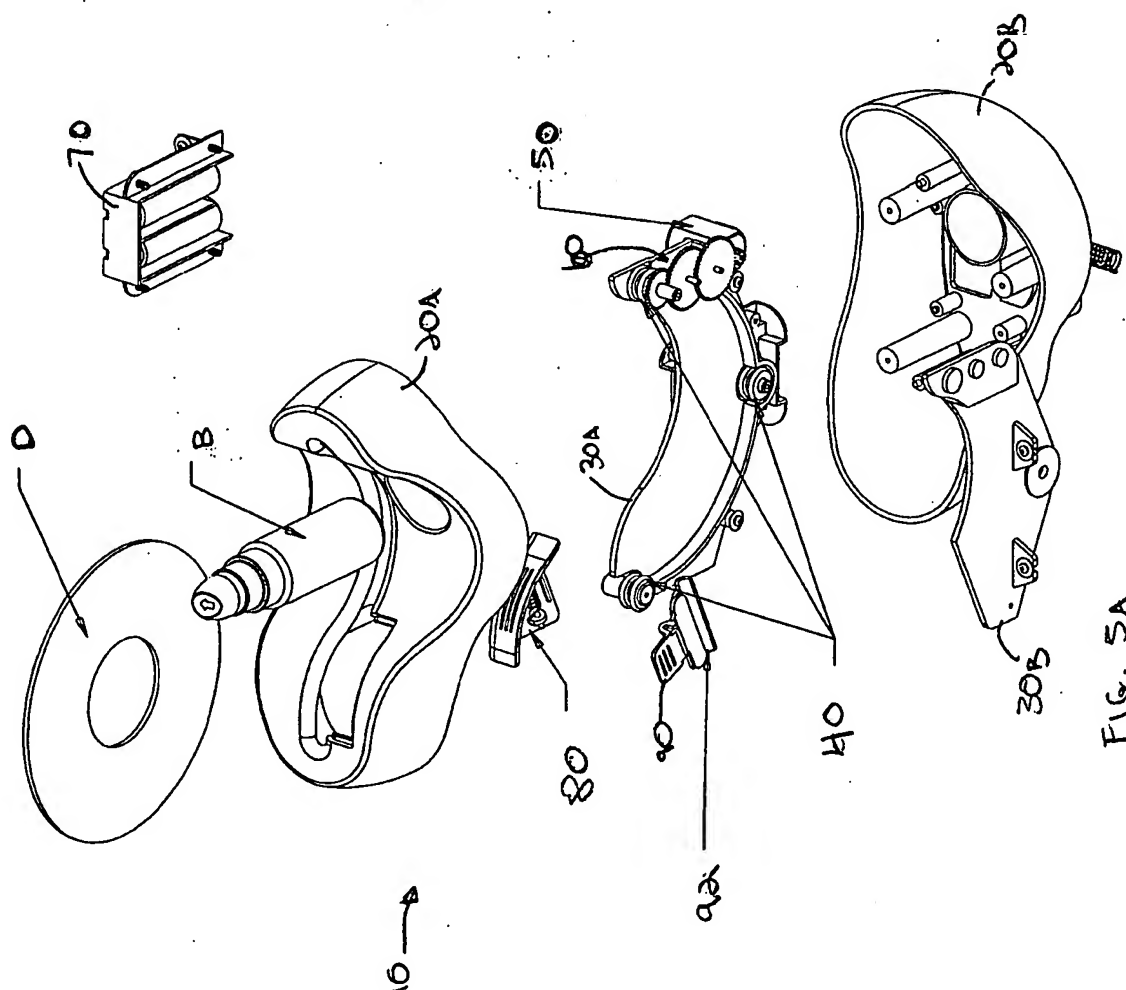
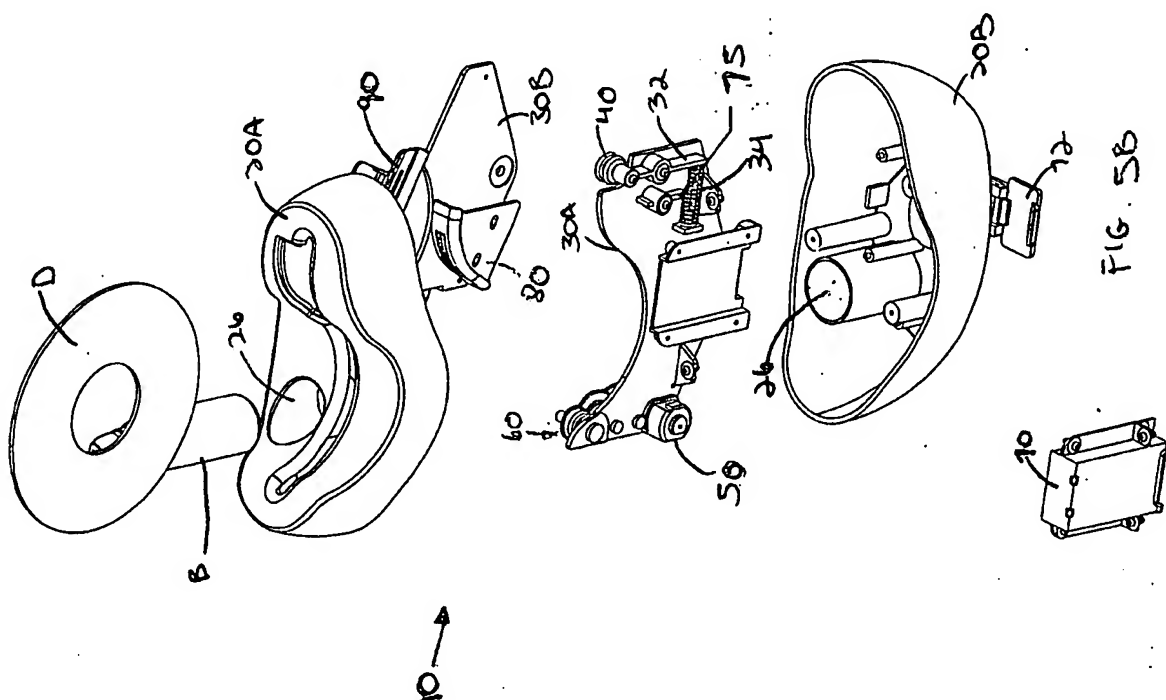
**ABSTRACT**

An embodiment of the invention provides a vertical disc cleaner. The cleaner includes a shaped housing with an elongated slot for accepting a portion of an optical disc. The top surface of the housing includes a depressed portion corresponding to the center of an inserted disc, and a well for storing a bottle of cleaning agent. Disposed within the housing is a power source, a motor coupled to a gear arrangement, and rollers for frictionally rotating an inserted disc by its perimeter. One roller is coupled to the gear arrangement and motor for driving the disc, and another roller is coupled to a switch for actuating the motor when the disc is inserted in the slot. A removable wiper pad is disposed within the housing and is urged against the disc to remove disc imperfections such as dust, dirt, fingerprints, smudges and the like.



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